

PROBLEMATICAL DISK-LIKE STRUCTURE FROM THE LATE PRECAMBRIAN OF WESTERN NEW SOUTH WALES

B. D. WEBBY

Department of Geology and Geophysics, University of Sydney

(PLATE X)

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Synopsis

A planar, disk-like structure with fine radiating markings is described from the late Precambrian Fowlers Gap Beds (Torowangee Group) of western New South Wales. A discussion of possible inorganic and organic origins is presented, and the structure compared with similar problematical impressions in other late Precambrian and Cambrian deposits.

INTRODUCTION

A few years ago N. F. Taylor discovered planar, medusoid-like imprints in deeply leached buff-white shales of the Fowlers Gap Beds (upper part of the Torowangee Group) at Carnies Tank on the property of Sturts Meadows, some 50 miles north-north-east of Broken Hill (Broken Hill 1: 250,000 Geol. Series Sheet SH/54-14; prov. edit., G. Rose, 1968; Grid ref. 482127). The stratigraphy of the Fowlers Gap Beds is outlined by Ward, Wright-Smith and Taylor (1969), and the location of Carnies Tank is shown on their Fig. 2, and on Fig. 1C of Webby (1970). The medusa-like occurrence lies stratigraphically just above the middle of the Fowlers Gap Beds (Webby, 1970, Fig. 2).

Over 40 specimens of the Carnies Tank structure have been collected recently from a large loose block on the north side of the tank. The block appears to have been excavated from below the surface during tank construction. The specimens are preserved in the plane of bedding in a buff-white, deeply leached, soft, powdery shale. Because of the softness of the material, it has been necessary to treat the surfaces exhibiting the structures immediately upon splitting. The surfaces were impregnated with a very dilute solution of polyvinyl acetate (PVA).

Figured specimens of the Carnies Tank structure are located in the palaeontological collection of the Department of Geology and Geophysics, University of Sydney.

DESCRIPTION

Planar, disk-like structure, lying in the plane of bedding, with smooth, sometimes impressed, outer rim (Pl. x, Figs. 1-9); varying from 27 to 110 mm. in diameter (mainly from 35 to 55 mm.). Radiating markings are fine, numerous, poorly preserved towards axis and periphery, but in intervening area seem to be continuous for up to 8 mm.; estimated to have approximately 180 fine, radial ridges around circumference; a rather irregular pattern of insertion of new ridges is exhibited; many of the ridges have a rather ragged outline and some develop an anastomosing character with cross struts or outgrowths; a meshwork structure is especially prominent towards the periphery and centre of certain specimens, and may be locally developed between radial ridges (Pl. x, Figs. 2 and 7); rare, more deeply impressed

radial markings (Pl. x, Fig. 6) may have a secondary origin, being formed perhaps by differential compaction. Most of the specimens collected are poorly preserved and do not show the fine radial markings. Where both surfaces of a specimen have been observed, one appears to have raised radiating ridges while the counterpart has complementary radiating furrows; original way up cannot be determined as specimens were not collected *in situ*.

DISCUSSION

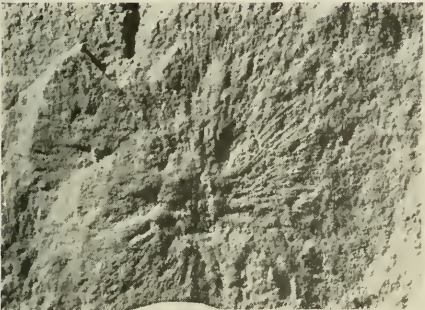
The Carnies Tank structure seems to be similar to a medusoid-like structure figured by Cloud (1968, Fig. 4K) and identified by him as an imprint of "radiating marcasite(?) growths parallel to surface of beds" and occurring in Upper Cretaceous strata of Colorado. Cloud's figured specimen has a diameter of about 45 mm. Specimens from the late Precambrian(?) Ord Group of the Kimberley region, Western Australia, also figured by Cloud (1968, Fig. 4G-I) and referred to "psendomedusae", bear a superficial resemblance to the Carnies Tank structure, but differ in having an irregularly lobed outer margin and concentric furrows. Apart from the large size attained by some of the Carnies Tank specimens (up to 110 mm. in diameter) and the smooth outer rim, they seem to be most satisfactorily interpreted as radiating, planar crystal growths. The occasional offsets and cross-connecting branches of the radial ridges may have been formed by a type of dendritic crystal growth.

Other possible origins may be considered. Altevogt (1968) has suggested that the problematical structure *Guilielmites* Geinitz originated from plastic mud balls during diagenesis becoming compressed to ellipsoidal and discoidal shapes. Slickenside striations were formed on the surfaces of the structures during compression. Such interpretations however cannot be applied to strictly planar forms like the Carnies Tank structure. The fine, radiating ridges are quite distinctly different from slickenside striations.

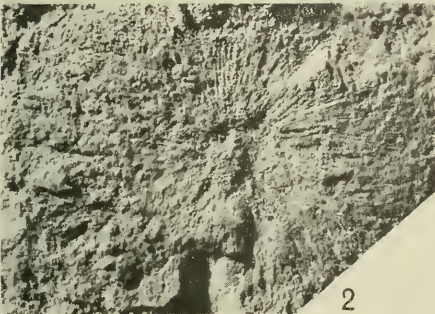
It also seems most unlikely that the specimens represent shatter or impact structures, for although they all lie parallel to the bedding, they occur scattered quite randomly through the large block. In their present highly leached and weathered state, it is inconceivable that they could have formed by recent dam-site blasting.

The possibility that the radial ridges may have been secondarily altered in the axial and peripheral parts of specimens to form the meshwork of connecting processes cannot be entirely ruled out. Such modification could be attributed to movement by ground-water solutions, though it remains puzzling why the effects are so selective. Areas exhibiting radial ridges, between axial and peripheral parts of the medusa-like structure are not noticeably affected. The basic difficulty in interpreting these structures is their deeply leached nature. The original composition of the material forming them is totally unknown.

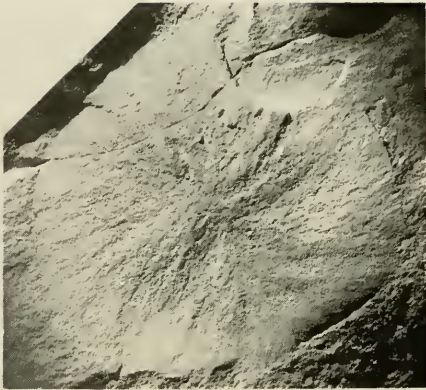
The regular disk-like outline, the size range and, in some specimens, the meshwork structure towards the axis and periphery may alternatively support an organic origin. The medusa *Protolyella* Torell from the Lower Cambrian of Sweden bears some similarity, but differs in having a large, circular, smooth, central area (Harrington and Moore, 1956, p. F155). *Paramedusium* Gürich from the Cambrian(?) of South-West Africa is perhaps more closely similar, with its fine radial ridges seeming to extend inwards nearer to the centre. But it may be distinguished by exhibiting two concentric furrows in the outer part of the disk. Furthermore, both *Protolyella* and *Paramedusium* have fine radiating ridges extending distally right to the outer margin.



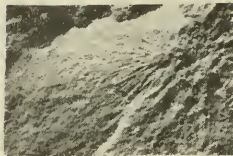
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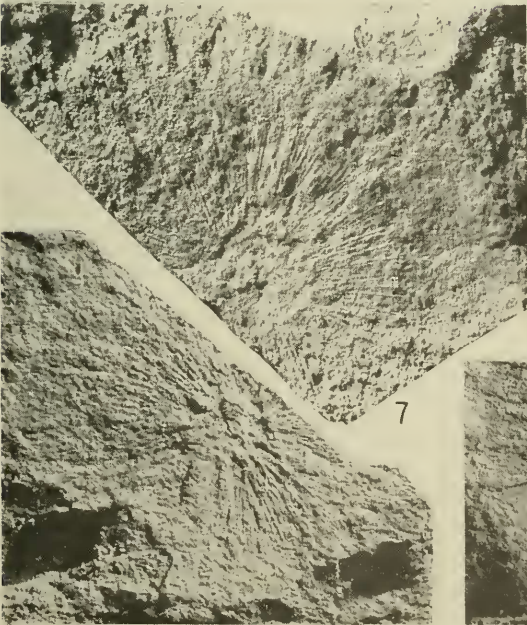
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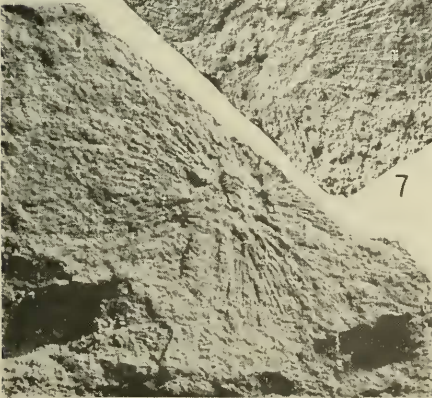
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